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REMARKS

Claims 1-3, 5-8, and 28 have been canceled. Claims 27 and 66 have been amended to recite full-length coding sequences. Support for the claim amendments can be found, for example, at page 12, lines 22-25 of the specification. No new matter has been added. Applicants respectfully request entry of the above amendments, which raise no new issues that would require further consideration and/or search, and which place the application in better condition for allowance.

Double Patenting

The Examiner provisionally rejected claims 1-8 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 and 47-54 of copending Application No. 09/771,904. This rejection is moot as claims 1-8 have been canceled.

Rejections under 35 U.S.C. §112, first paragraph

The Examiner rejected claims 1-3, 5-8, 10, 27-29, 31-35, 37-46, and 55-70 under 35 U.S.C. §112, first paragraph, for lack of written description. The Examiner asserted that the rejection was maintained "given that applicant does not describe fragments as small as 20 nucleotides that encode mutant delta-12 or delta-15 fatty acid desaturases.

Claims 1-3, 5-8, and 28 have been canceled. Amended claims 10, 27, 29, 31-35, and 66 recite full-length coding sequences and have more than adequate written description in the specification. For example, the specification describes the sequence of conserved motifs in delta-12 and delta-15 desaturases from various species, including *Arabidopsis thaliana*, *Glycine max*, and *Zea mays*, and cites references for such sequences. See, page 14, line 2 through page 15, line 17, and Tables 1-5 of the specification. In particular, the specification discloses that an HECGH (in one-letter amino acid code), HRRHH, HVAHH, or YLNNP motif can be mutated.

The specification also provides examples of mutated motifs. The specification indicates that insertions of nucleotides, deletions of nucleotides, and transitions and transversions of nucleotides can render the resulting gene product non-functional. Such mutations can result in

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insertions of one or more amino acids, deletions of one or more amino acids, and non-conservative amino acid substitutions in the corresponding gene product. See, for example, the specification at page 12, line 26 through page 13, line 4. For example, the specification indicates that substitution of a glycine residue for either one of the histidine residues in an HECGH motif can render the resulting gene product non-functional. The specification also indicates that insertion of a glycine residue between the cysteine and glutamic acid residues in an HECGH motif can render the resulting gene product non-functional. See, for example, the specification at page 14, line 30 through page 15, line 6. Thus, the specification provides sufficient written description for the claimed genus of nucleic acids.

The specification also provides sufficient written description for the plants of claims 35 and 37-46, the methods for producing plant lines recited in claims 55-65, and the methods for identifying mutations of claims 67-70. Applicants note that the plants of claims 35 and 37-46 contain full-length coding sequences of the desaturase genes. As discussed above, the specification describes the sequence of conserved motifs in delta-12 and delta-15 desaturases from various species and provides examples of mutated motifs. The specification also describes methods for producing plants and plant lines. See, for example, page 10, lines 3-24, page 20, lines 33 through page 21, line 9, and Scheme I of the specification. Methods for identifying mutations in delta-12 or delta-15 desaturase genes also are provided. See, page 27, lines 22-32, and Examples 12-14 of the specification. Thus, the specification provides sufficient written description for the plants, methods of producing plant lines, and methods for identifying mutations as recited in claims 25, 37-46, 55-65, and 67-70. In view of the above remarks, the Examiner is requested to withdraw the rejection of claims 10, 27, 29, 31-35, 37-46, and 55-70 under 35 U.S.C. § 112, first paragraph, for lack of written description.

The Examiner rejected claims 1-3, 5-8, 10, 27-29, 31-35, 37-46, and 55-70 under 35 U.S.C. §112, first paragraph, for lack of enablement. The Examiner asserted that the rejection was maintained "given that the disclosed plants were isolated by mutagenesis and introducing mutations in not a repeatable method for obtaining a plant, and applicant has not taught how to use the claimed nucleic acids, as stated in the last office action, and it would require undue experimentation to practice the claimed invention."

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Applicants respectfully disagree with the Examiner. Applicants will first discuss the claimed plants.

Enablement requires that the specification teach those in the art how to make and use the invention without 'undue experimentation.' See *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). Here, the specification provides detailed guidance to enable one of ordinary skill in the art to make and used the claimed plants. In particular, the specification describes mutagenesis of *Brassica* and selection of various lines in great detail. See, specification, page 10, lines 10-24, page 20, line 39 through page 21, line 5; and page 24, lines 18-23. Extensive information is provided for mutagenesis of seeds, as well as for mutagenizing plants in other stages of development. Furthermore, the specification describes a variety of compounds that can be used to induce mutagenesis. See, specification, page 20, line 39 through page 21, line 4. The specification also indicates that low mutagen doses can be used to eliminate the occurrence of deleterious mutations and reduce the load of mutations carried by a plant such that single gene mutations can be rapidly selected. See, specification at page 24, lines 18-23. While mutations may occur at any location on the genome of a plant, mutagenesis and selection are standard methods to obtain *Brassica* and *Helianthus* mutants in the plant breeding art. See, U.S. Patent 5,710,366 at column 1, lines 36-66, which refers to a number of published reports regarding sunflower mutagenesis. A copy of U.S. Patent 5,710,366 is enclosed. See also, Wong et al., EP 323 753, cited in the Information Disclosure Statement of April 9, 1996, which discusses mutagenesis of *Brassica*. These publications confirm that, with the knowledge disclosed in the present specification concerning the nature of the mutations, one of ordinary skill could obtain the claimed plants with only routine experimentation.

The law does not require that Applicants disclose other or all methods of producing a claimed invention. See, e.g., *Spectra-Physics, Inc. v. Coherent, Inc.*, 827 F.2d 1524, 1533, 3 USPQ2d 1737, 1743 (Fed. Cir.), *cert. denied*, 484 U.S. 954 (1987) (failure to disclose all methods by which the claimed invention can be made does not render a claim invalid under 35 U.S.C. §112). However, Applicants have also disclosed methods other than mutagenesis. For example, Applicants have disclosed site-directed mutagenesis as a method of producing the claimed plants. See, specification at page 18, lines 13-17. The specification provides the nucleic

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acid and amino acid sequences of two *Brassica* delta-12 desaturases at SEQ ID NO:1 and SEQ ID NO:5. The nucleic acid and amino acid sequences of a *Brassica* delta-15 desaturase are provided in WO 93/11245. Techniques for transformation of *Brassica* or *Helianthus* were known in the art, and the disclosed mutant nucleic acids could have been introduced using such techniques. As an alternative, one of ordinary skill in the art could have obtained IMC 129 seed from the American Type Culture Collection under Accession No. 40811, cloned full-length delta-12 or delta-15 desaturase coding sequences, and transformed them into *Brassica* or *Helianthus*. Thus, Applicants have disclosed other methods of producing the claimed plants. In view of the above, the specification enables one of ordinary skill to make and use the claimed plants without undue experimentation.

The specification also enables one of ordinary skill to make and use the claimed nucleic acids, which relate to a full-length *Brassicaceae* delta-15 fatty acid desaturase coding sequence having at least one mutation in a region of the desaturase gene encoding a HXXXXH amino acid motif or a full-length *Brassicaceae* or *Helianthus* delta-12 fatty acid desaturase coding sequence having at least one mutation in a region of the desaturase gene encoding a YLNNP (SEQ ID NO:50) amino acid motif. For example, the specification at page 27, lines 22-32, indicates that such nucleic acids can be used, for example, as markers in plant genetic mapping and plant breeding programs. The specification also indicates in Example 14 that the claimed nucleic acids can be used to develop gene-specific PCR markers. Thus, in contrast to the Examiner's assertions, Applicants have taught how to use the claimed nucleic acids. In view of the above remarks, the Examiner is requested to withdraw the rejection under 35 U.S.C. §112, first paragraph.

Rejections under 35 U.S.C. §112, second paragraph

The Examiner rejected claims 55, 57, 62, and 64 under 35 U.S.C. §112, second paragraph, as being indefinite. The Examiner asserted that steps are missing in the claim for the production of a plant line is step (d).

Applicants disagree. Step (d) of claims 55, 57, 62, and 64 should not be limited to a particular method for producing a plant line. The specification indicates that a "line" is a group

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of plants that display little or no genetic variation between individuals for at least one trait. See, specification at page 10, lines 3-5. The specification also indicates that there are different methods for producing plant lines. For example, the specification indicates plant lines can be produced by several generations of self-pollination and selection, or by vegetative propagation from a single plant using tissue or cell culture techniques. See the specification at page 10, lines 5-8. Since the term "line" would be understood by one of skill in the art and there are different methods available to produce plant lines, step (d) of claims 55, 57, 62, and 64 is sufficiently definite.

CONCLUSION

Applicants respectfully request reconsideration and allowance of claims 10, 27, 29, 31-35, 37-46, and 55-70 in view of the above amendments and remarks. No extension fees are due as this response is being filed before the end of the shortened statutory period. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: Mar 14, 2005

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